National Aeronautics and Space Administration
Lyndon B. Johnson Space Center
Houston, Texas

Giving blood

JSC blood drive is set for next week and benefits the JSC family. Story on Page 3.

total health

Stress seminar

Learn how to deal effectively with stress on the job and at home. Story on Page 4.

Space News Roundup

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JSC Photo by Benny Benavides

PANORAMIC SPACE—Artist Dennis Ivy unveils his 6- by-160-foot mural in Houston's downtown underground tunnel near Houston Light and Power at 1111 Louisiana. The mural is composed of 21 Apollo-era images interlaced with six west Texas desert views. Each panel weighs 400 pounds and was constructed in Ivy's studio. Ivy worked with JSC in selecting the photos he used.

Endeavour to launch Sunday

By James Hartsfield

Launch preparations of *Endeavour* for STS-77 are on schedule for a liftoff at 5:30 a.m. CDT Sunday to begin a 10-day flight devoted to helping open the commercial space frontier.

The countdown was to begin early Thursday and the STS-77 astronauts—Commander John Casper, Pilot Curt Brown and Mission Specialists Andy Thomas, Dan Bursch, Mario Runco and Marc Garneau—were to arrive at KSC later that day.

Endeavour's 11th mission will feature more rendezvous and station-keeping activities than ever before accomplished on a single shuttle flight. The first rendezvous activities will highlight investigations of an inflatable space antenna carried on the Spartan-207 satellite. Ensuing rendezvous activities will investigate new methods of maintaining a stable orientation in space by the Satellite Target Unit, part of the Passive Aerodynamically Stabilized Magnetically Dampled Satellite, or PAMS, experiment.

More than 90 percent of the payloads aboard *Endeavour* are joint ventures with industry, sponsored by the NASA Headquarters Office of Space Access and Technology through its Commercial Space Centers and industrial affiliates. Among the experiments are one and a half tons of equipment aboard the fourth Spacehab shuttle flight.

Fueling of *Endeavour*'s external tank is planned to begin at about 8:40 p.m. CDT Saturday, and an on-time launch Sunday would lead to a planned landing of STS-77 at 6:07 a.m. CDT May 29.

Elsewhere, work is continuing to proceed smoothly on *Columbia*, in KSC's Bay 2 processing hangar being readied for a mid-June launch on STS-78.

Space station air system passes test

The system that will purify the air aboard the International Space Station recently passed a major test at NASA's Marshall Space Flight Center.

The month-long test evaluated the system's ability to control carbon dioxide, oxygen and air pressure inside the station's living and laboratory quarters. Simulating the breathing activity of a crew of four, engineers injected carbon dioxide and water vapor, and removed oxygen from the school bus-sized, 6,200-cubic-foot test module throughout the 30-day test to evaluate an air purification system.

"The test provided an excellent demonstration of the capability for maintaining cabin air composition using control procedures to be used onboard the space station," said Jay Perry, test principal investigator and life support engineer of Marshall's Thermal and Life Support Division. "Throughout the test, the system operated in a fully automated fashion and its components responded very well to the simulated human breathing," Perry explained. The test was the fifth in a series begun in 1987.

The test also featured operation of the carbon dioxide removal system at reduced levels to save power. The test system operated at full power levels during the 53-minute daytime portion of the orbit and at lower levels during the 37-minute nighttime orbit, just as planned for space station. The nitrogen and oxygen composition of the atmosphere was controlled by signals from an air composition monitor, and special computer software very similar to that planned for use on the space station was developed for automated control during the test.

The Atmosphere Revitalization Subsystem demonstrated the capability of providing a healthy working environment for the crew and achieved a power savings of up to 200 watts over previous operating modes. These savings are significant and represent additional electrical power available for science experiments onboard the space station, Perry said.

Additional testing is planned to determine the capability of the various subsystems to remove other trace contaminants. The hardware is scheduled to be launched in 1998. Marshall is conducting a variety of air purification tests in support of the Space Station Program Office.

Lucid begins Earth observations while JSC team monitors

Mir crewmates Onufrienko, Usachev get word stay will be longer to accommodate Russian flight schedule

Mir 21 Cosmonaut Research Shannon Lucid began Earth observations this week on board the Russian Mir Space Station.

Lucid, along with Commander Yuri Onufrienko and Flight Engineer Yuri Usachev, began work this week in the newest science workshop—the Priroda module—to observe Earth from space and conducted other scientific examinations.

Lucid observed the Altai Mountains, North Caspian Sea, Danube River Delta, Gulf of Venezina, Southern Luzon, Voronezh and the Great Salt Lake. Some sites have been passed over due to weather conditions, but most observations have been successful.

Priroda is equipped with instruments to monitor ecological situations in large industrial areas, clouds and the ozone, study the ocean surface and its interaction with the atmosphere, plot geological maps to refine mineral and water reserves and study the Earth to help define economic and ecological theories of natural resource utilization.

All of the work conducted by the Mir 21 crew is being monitored by a team of scientists at the Russian Mission Control Center in Kaliningrad and here at JSC. NASA Mir Mission Scientist John Uri heads up the team here in Houston.

"We're very excited by Shannon's progress," Uri said. "I think the research program is going extremely well. We're pretty much where we thought we would be. We've actually completed two of the experiments already, one in fundamental biology looking at egg development, and another in materials processing. Those were completed pretty much on schedule. All of her other activities are proceeding nominally."

The Priroda has facilities—microgravity glovebox, microgravity isolation mount and remote sensing equipment—that will be used throughout the Phase 1 program Uri said.

In order to prepare for science work on Priroda, Lucid reviewed experiment procedures and her pre-mission training using the Crew On-Orbit Support System—an audio-video system. This is the first flight of the new system, which may be used on the International Space Station.

Radiation measurements are being taken by the crew routinely throughout the mission. The dosimeters are mounted throughout the station to gather radiation data at various locations. Radiation data stored electronically on the Tissue Equivalent Proportional Counter was called down by the crew.

Last week, Lucid's crew mates were notified that they will be staying on board Mir a bit longer than originally planned. The Mir 21 mission has been extended until mid-August to accommodate an adjustment to the Russian flight schedule. At that time, a new crew will be launched. Lucid's stay on Mir will not be affected; she still returns to Earth in early August, after Atlantis delivers Astronaut John Blaha to the Mir on the next shuttle docking mission, STS-79.

Today, Onufrienko and Usachev mark their 84th day aboard Mir. Lucid has been on Mir for 56 days.

Teacher workshop offered

By Mae Mangieri

JSC employees' relatives and friends will have the opportunity to attend a week-long workshop at JSC this summer.

JSC's Education and Information Services Branch will offer an aerospace professional development workshop for 30 elementary and secondary school teachers who are family members or friends of JSC civil service and contractor employees. The workshop will be held at JSC, from 8:30 a.m.-5 p.m. July 29 -August 2.

"There is no cost to attend the week-long workshop and it is an exciting way for teachers who are JSC family members or close friends to connect to the space program," said Billie Deason, education team lead. "The workshop is an opportunity to show PAO's gratitude to the many employees who help JSC meet its educational goals throughout the year."

The workshop enables teachers to become aware of how NASA programs incorporate science, mathematics and technology. During the course of the workshop, teachers also gain a historical perspective of NASA.

Highlights of the workshop include a hands-on space suit, rocketry and microgravity activities demonstrated by Gordon Eskridge and Angelo Casaburri, aerospace education specialists from Oklahoma State

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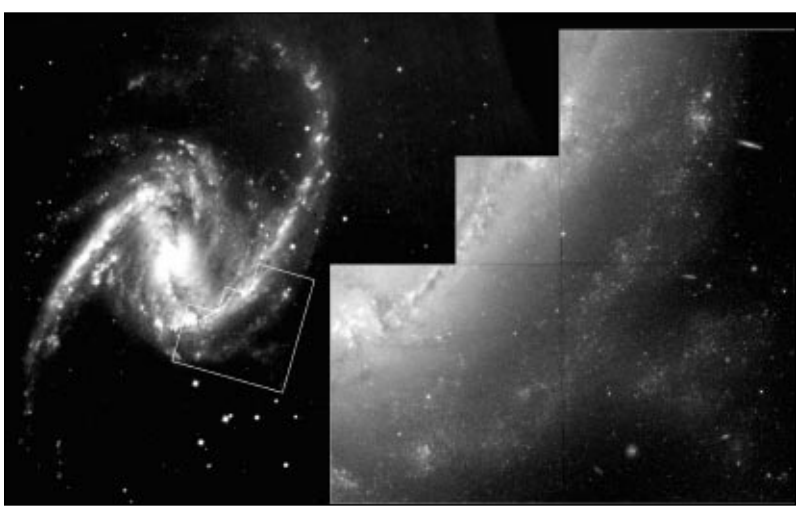

This image from the Hubble Space Telescope shows a region in NGC 1365, a barred spiral galaxy located in a cluster of galaxies called Fornax. A barred spiral galaxy is characterized by a "bar" of stars, dust and gas across its center.

Astronomers measure distant stars

Two international teams of astronomers, using NASA's Hubble Space Telescope, are reporting progress in measuring the universe's rate of expansion—a value that has been debated for over half a century.

These new results yield ranges for the age of the universe from 9-12 billion years, and 11-14 billion years. The goal is to measure the Hubble Constant to 10 percent accuracy.

"We have five different ways of measuring the Hubble Constant with HST," said Wendy Freedman of Carnegie Observatories. "The results

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